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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,930	04/13/2005	Ralph Nonninger	26553U	7436

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EXAMINER	
SANDERS, KRIELLION ANTIONETTE	
ART UNIT	**PAPER NUMBER**
1714	

DATE MAILED: 06/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/516,930	NONNINGER ET AL.	
	Examiner	Art Unit	
	Kriellion A. Sanders	1714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 12/3.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-20 are rejected as being unpatentable under 35 USC § 103(a) as being unpatentable over Mulvaney et al, US Patent No. 6548168 in view of Oldenburg et al, US Patent No. 6344272.

Mulvaney et al. discloses stabilized nanoparticles having a size of less than about 0.1 microns or 100 nm, that are stabilized by an insulating, semiconducting and/or metallic coating and methods for their production. The particle may comprise a metal, such as copper, silver, gold, platinum, or a metal compound or alloy such as a metallic sulphide, a metallic arsenide, a metallic selenide, a metallic telluride, a metallic oxide, a metallic halide or a mixture thereof. Preferred particles are semiconductor nanoparticles. Examples of semiconductor nanoparticles include cadmium sulphide (CdS), germanium (Ge), silicon (Si), silicon carbide (SiC), selenium (Se), cadmium selenide (CdSe), cadmium telluride (CdTe), zinc sulphide (ZnS), zinc selenide (ZnSe)and zinc oxide (ZnO. The particle is coated with a coating layer. Preferably the coating

thickness is between 10 and 30 nm. The coating is bonded to the particle through a bifunctional ligand of the formula:

A--X—B

wherein A is a first functional group that attaches to the particle, or to a coating formed on the particle, B is a second functional group that activates the surface of the core particle for nucleation of a coating layer and X is an optional linking group.

The coating is selected from the group consisting of silica, Se, an organic conducting polymer, a metal, a metal oxide, a metal sulphide, a metal selenide, a metal telluride, and a metal halide. The metal oxide may be selected from the group consisting of titania, zirconia, alumina, zinc oxide, tin dioxide, or manganese oxide. The source of coating may be a metal sulfide selected from the group consisting of CdS and ZnS. The source of the coating may be a metal selenide selected from the group consisting of CdSe and ZnSe. The source of the coating may be a metal telluride selected from the group consisting of CdTe and ZnTe. The source of the coating may be a metal halide selected from the group consisting of silver iodide (AgI) and silver bromide (AgBr). The source of the coating may be a metal selected from the group consisting of platinum, palladium, iridium, bismuth, copper, silver, gold, and alloys and mixtures thereof. See col. 1, line 22 through col. Through col. 5, line 52.

The stabilized particles of Mulvaney et al may be used to produce pigments, paints, fabrics and optics. See col. 8, lines 31-33.

In view of the fact that Mulvaney et al discloses the stabilized pigments to be useful in

formulating paints, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to formulate a coating composition utilizing the claimed particles. This is particularly true since paints are a type of coating material. Likewise, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to select the most advantageous weight percentages of components from those disclosed within the Mulvaney et al invention to achieve the greatest antimicrobial results as desired. Since the components of the nanoparticlces of Mulvaney al are the same as applicant's it is thought that the core-shell nature of patented and present particles are also the same.

Oldenburg et al discloses core-shell particles or particle mixtures of that may be added to polymers during their preparation by methods well known in the art. Suitable polymers include polyethylene, polyvinyl alcohol (PVA), latex, nylon, teflon, acrylic, Kevlar and epoxy. The compositions of the invention are particles that have at least two layers. At least one layer is immediately adjacent to and surrounds another layer. The innermost layer is the core. A layer that surrounds the core is the shell layer. The shell layer is metal-like in that it can conduct electricity and is made of a metal or metal-like material. It is also preferred that the adjacent inner layer to the shell layer be nonconducting. Specifically contemplated are nonconducting layers made of dielectric materials and semiconductors. Suitable dielectric materials include but are not limited to silicon dioxide, titanium dioxide, polymethyl methacrylate (PMMA), polystyrene, gold sulfide and macromolecules such as dendrimers. In certain embodiments of the invention, the nonconducting layer is comprised of a semiconductor material. For example, core particles may be made of CdSe, CdS or GaAs. In spherical embodiments, the particles have a homogeneous radius that can range from approximately 1 to 10 nanometers to several microns

depending upon the desired absorbance maximum of the embodiment. The conducting shell layers of the invention have thicknesses that range from approximately 1 to 100 nm. One unique aspect of the method is the attachment of conducting materials of the shell to the nonconducting inner layer. In the methods of the invention, this step is carried out in solution. Suitable solvents for linker molecule attachment depends upon the reactants and a variety of solvents may work under a given set of conditions. In Example III, the solvent of choice for the attachment of APTES to silicon dioxide is anhydrous ethanol. Generally, metal is deposited onto tethered clusters and the clusters are enlarged until a coherent metal shell of the desired thickness is formed. In the method of Example V, the metal can be deposited through a reduction process of solution metal onto the tethered clusters. Alternatively, metal can be deposited on the tethered metal clusters by a "colloid-based" deposition process. The deposition can also be initiated or driven photochemically.

Formulation of an acrylic coating composition containing the core-shell particles of Oldenburg et al wherein the metal coating is applied to the core by a UV radiation-induced redox reaction would have been obvious to one of ordinary skill in the art at the time of applicant's invention. See col. 3, line 35 through col. 8, line 30 and Examples IV and V.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kriellion A. Sanders whose telephone number is 571-272-1122. The examiner can normally be reached on Monday through Thursday 6:30-7:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kriellion A. Sanders
Primary Examiner
Art Unit 1714

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